Stoller
Grand Junction Office established 1959

GJO-2004-565-TAC

C4227
Log Data Report

Borehole Information:

Borehole: C4227			**Site:** 216-U-12 Crib		
Coordinates (WA State Plane)		**GWL (ft)[1]:** Dry		**GWL Date:**	01/26/2004
North	**East**	**Drill Date**	**TOC[2] Elevation**	**Total Depth (ft)**	**Type**
Not Available	Not Available	Jan. 2004	Not Available	50	Push Hole

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Threaded steel	0	6 5/8	5 5/8	1/2	0	50
The logging engineer measured a sample of casing located in a lay-down area next to the borehole. Outside casing diameter was measured using a caliper. The caliper and inside casing diameter were measured using a steel tape, and measurements were rounded to the nearest 1/16 in.						

Borehole Notes:

This push-hole is located approximately 45 ft west of abandoned borehole 299-W22-60. Zero reference is the ground surface.

Logging Equipment Information:

Logging System:	Gamma 1E		**Type:** SGLS (70%) 34TP40587A
Calibration Date:	01/2004	**Calibration Reference:**	GJO-2004-568-TAC
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	**1**	**2 / Repeat**			
Date	01/26/04	01/26/04			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	48.5	15.5			
Finish Depth (ft)	0.5	10.5			
Count Time (sec)	100	100			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			
ft/min	N/A[3]	N/A			
Pre-Verification	AE068CAB	AE068CAB			
Start File	AE068000	AE068049			
Finish File	AE068048	AE068054			
Post-Verification	AE070CAA	AE070CAA			

Log Run	1	2 / Repeat			
Depth Return Error (in.)	0	0			
Comments	No fine-gain adjustment.	Repeat section			

Logging Operation Notes:

Zero reference was ground surface. Logging was performed with a centralizer installed on the sonde. Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT (^{40}K, ^{238}U, and ^{232}Th) verifier with serial number 118. Logging started at the nearest 0.5-ft interval after reaching total depth. Maximum logging depth achieved was 48.5 ft.

Analysis Notes:

Analyst:	Sobczyk	Date:	1/27/04	Reference:	GJO-HGLP 1.6.3, Rev. 0

SGLS pre-run and post-run verification spectra were collected at the beginning and end of the day. All of the verification spectra were within the control limits. The peak counts per second (cps) at the 609-keV, 1461-keV, and 2615-keV photopeaks on the post-run verification spectra as compared to the pre-run verification spectra for each day were between 9.1 percent lower and 1.6 percent higher at the end of the day. Examinations of spectra indicate that the detector functioned normally during logging, and the spectra are accepted.

Log spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Verification spectra were used to determine the energy and resolution calibration for processing the data using APTEC SUPERVISOR. Concentrations were calculated in EXCEL (source file: G1EJan04.xls). Zero reference was the ground surface. Based on the field measurements, the casing configuration was assumed as one string of 6-in. casing with a thickness of 1/2 in. to 48.5 ft (total logging depth). Dead time and water corrections were not required.

Log Plot Notes:

Separate log plots are provided for gross gamma and dead time, naturally occurring radionuclides (^{40}K, ^{238}U, and ^{232}Th), and man-made radionuclides. Plots of the repeat logs versus the original logs are included. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, or casing correction. These errors are discussed in the calibration report. A combination plot is also included to facilitate correlation. The ^{214}Bi peak at 609 keV was used to determine the naturally occurring ^{238}U concentrations on the combination plot rather than the ^{214}Bi peak at 1764 keV because it exhibited slightly higher net counts per second.

Results and Interpretations:

Man-made radionuclides were not detected in this borehole.

The plots of the repeat logs demonstrate reasonable repeatability of the SGLS data for the natural radionuclides at energy levels of 609, 1461, 1764, and 2614 keV.

[1] GWL – groundwater level
[2] TOC – top of casing
[3] N/A– not applicable

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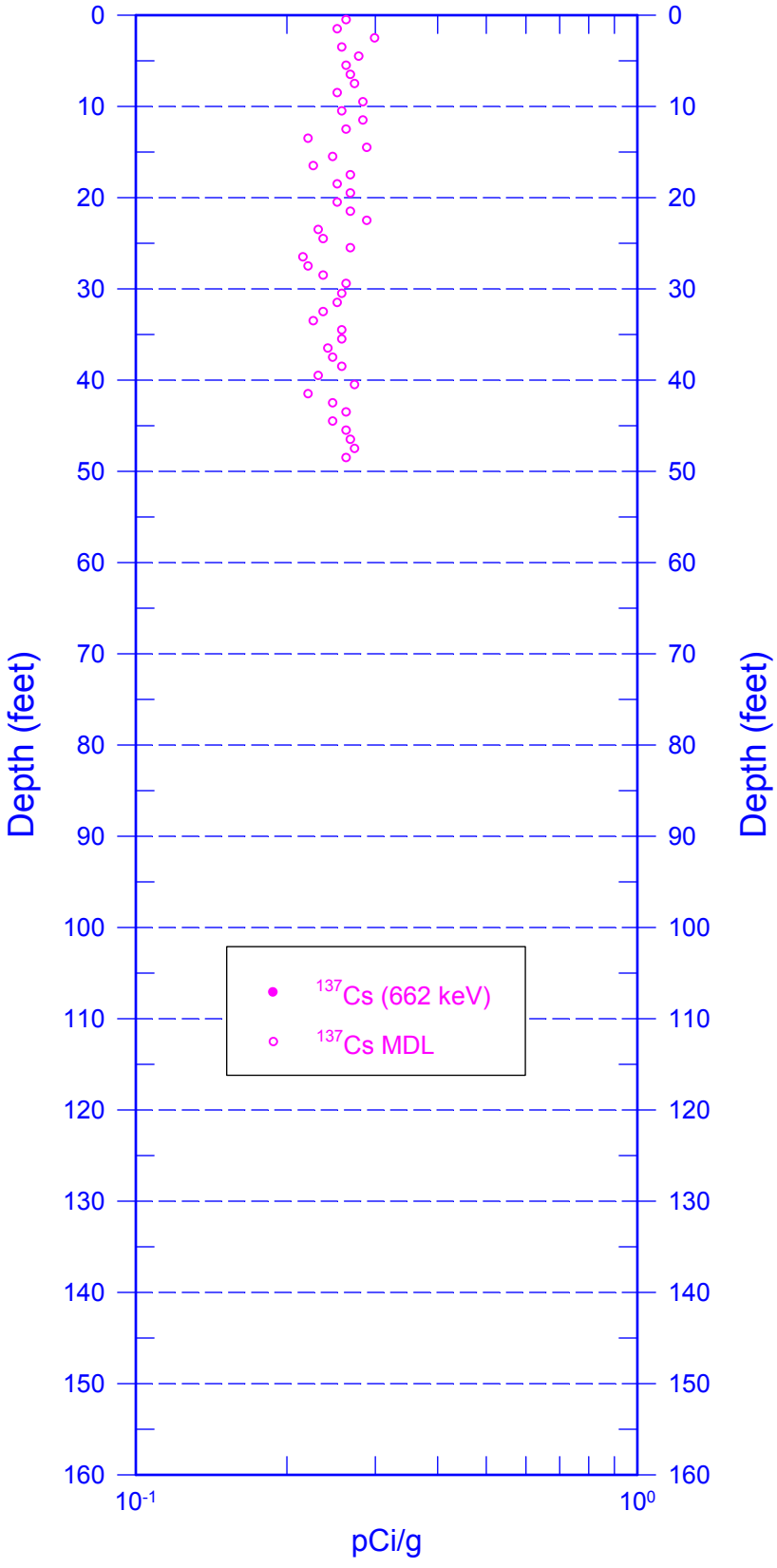
Man-Made Radionuclides



Zero Reference = Ground Surface

Date of Last Logging Run
1/26/2004

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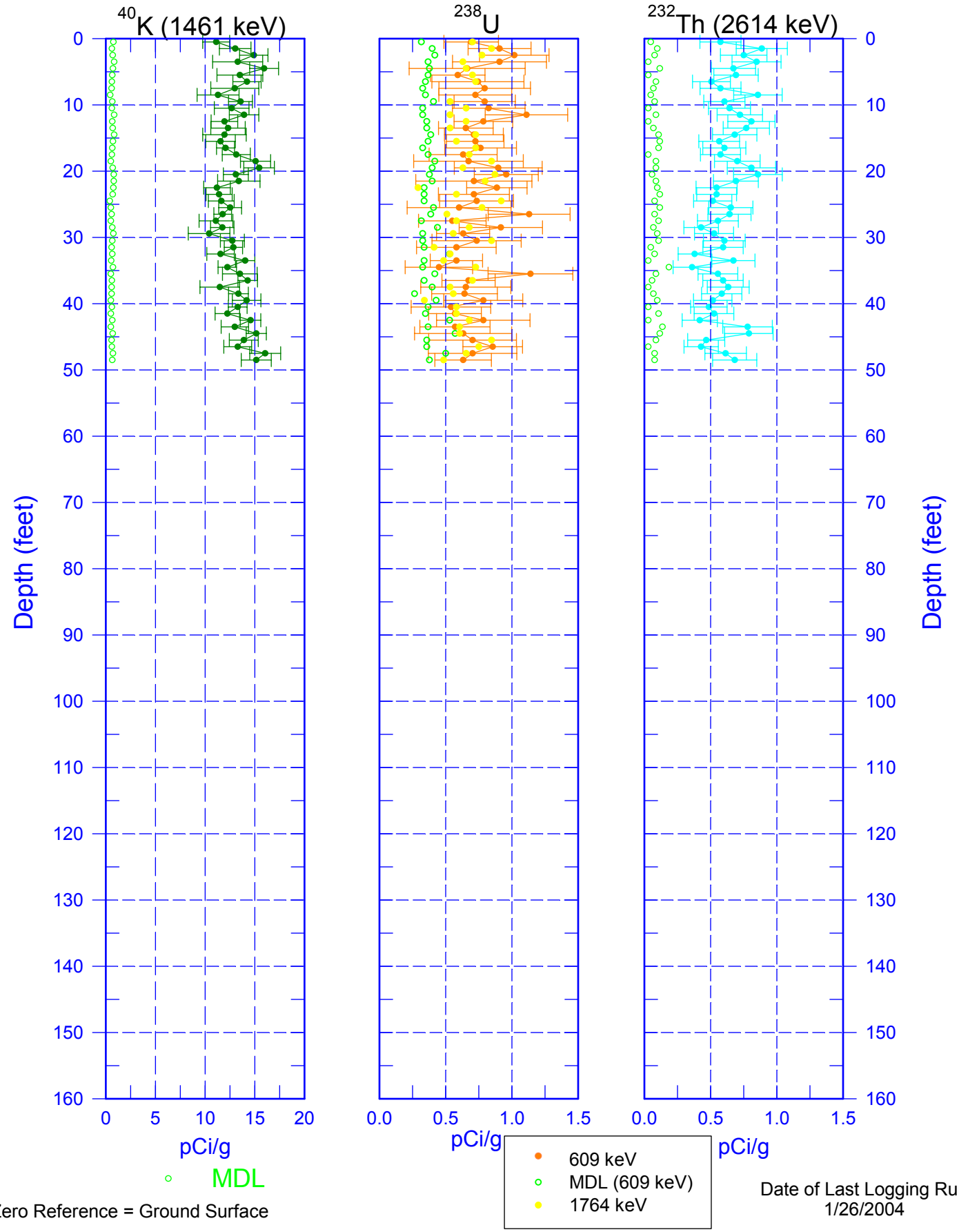
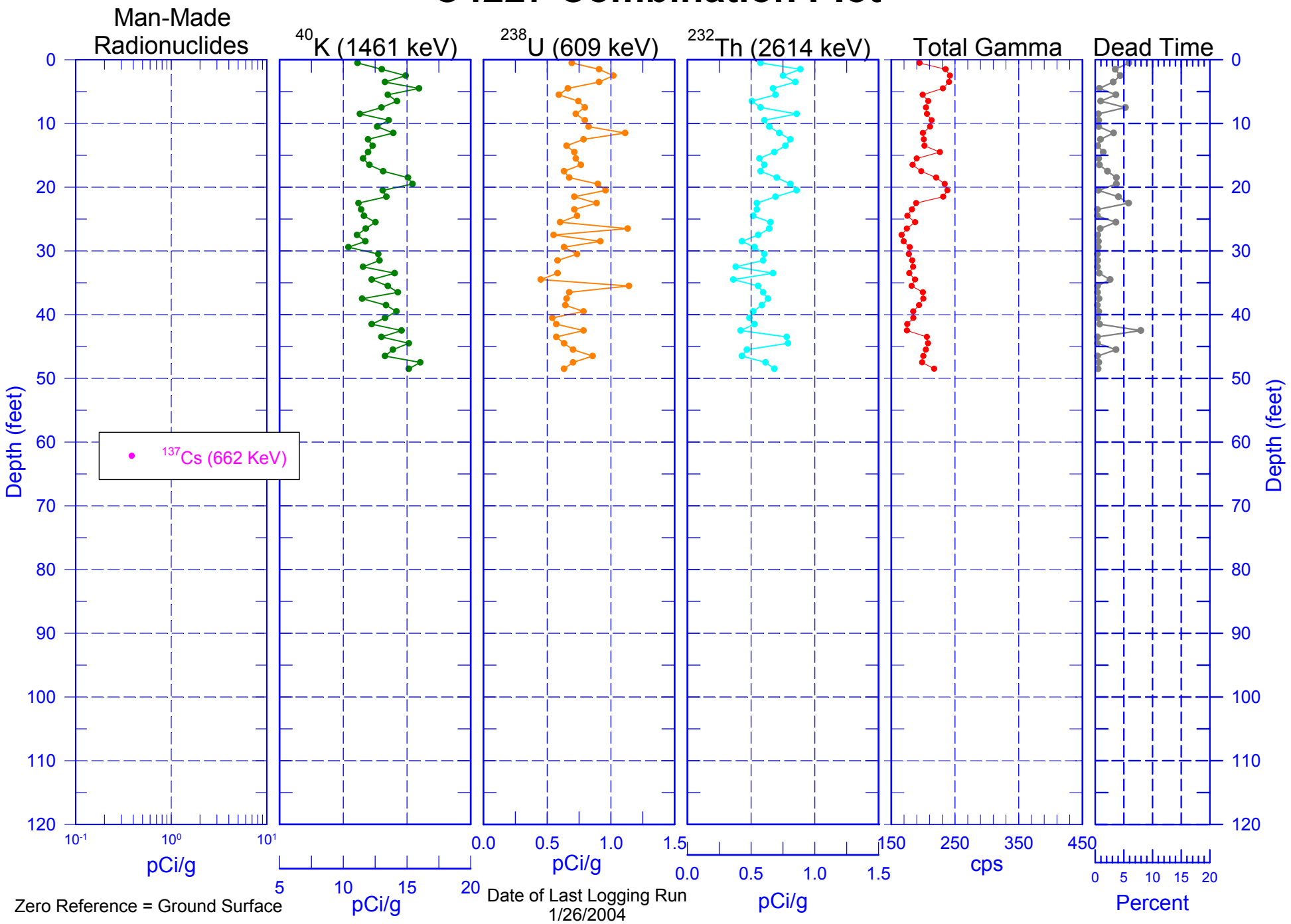
Natural Gamma Logs



Zero Reference = Ground Surface

Date of Last Logging Run
1/26/2004

C4227 Combination Plot



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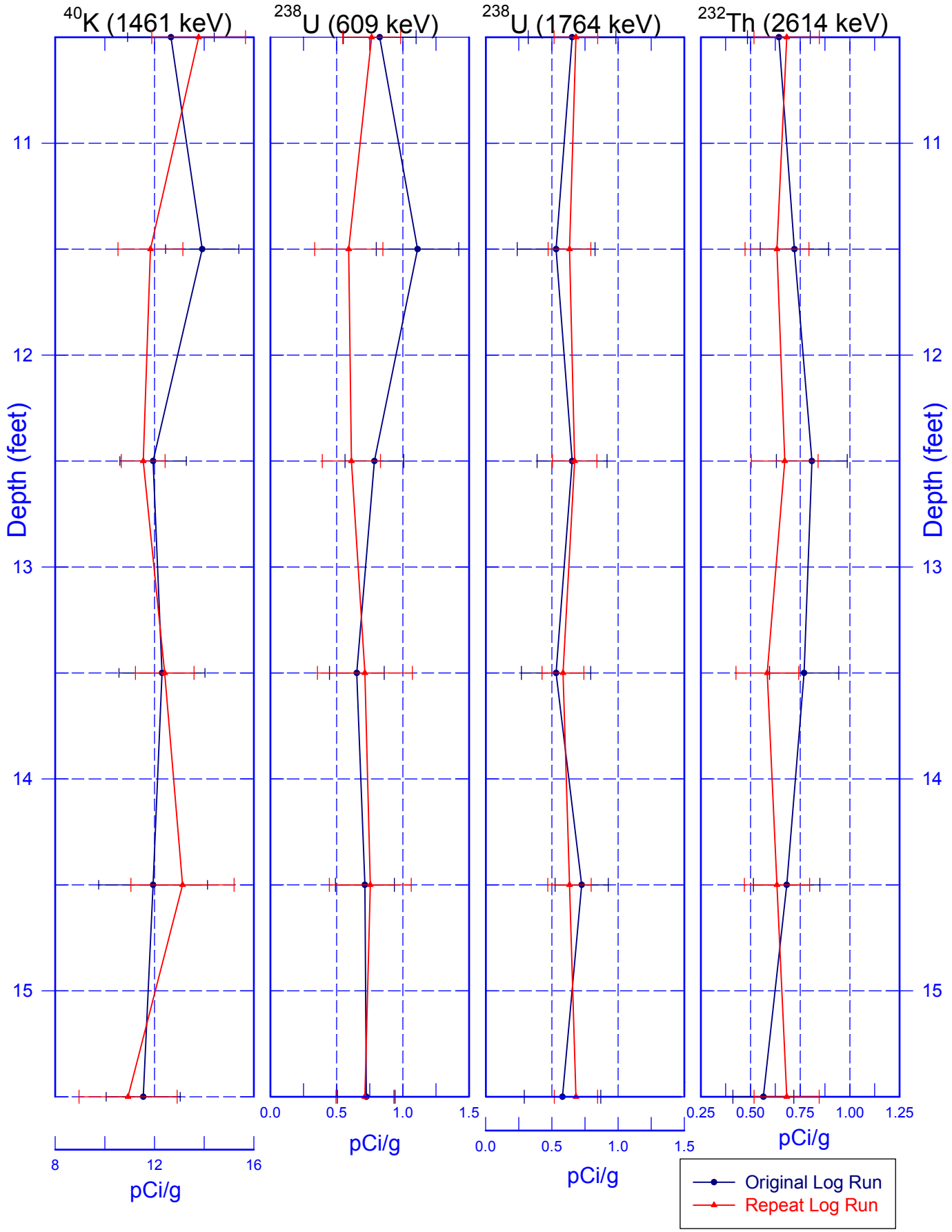
Rerun of Natural Gamma Logs (15.5 to 10.5 ft)



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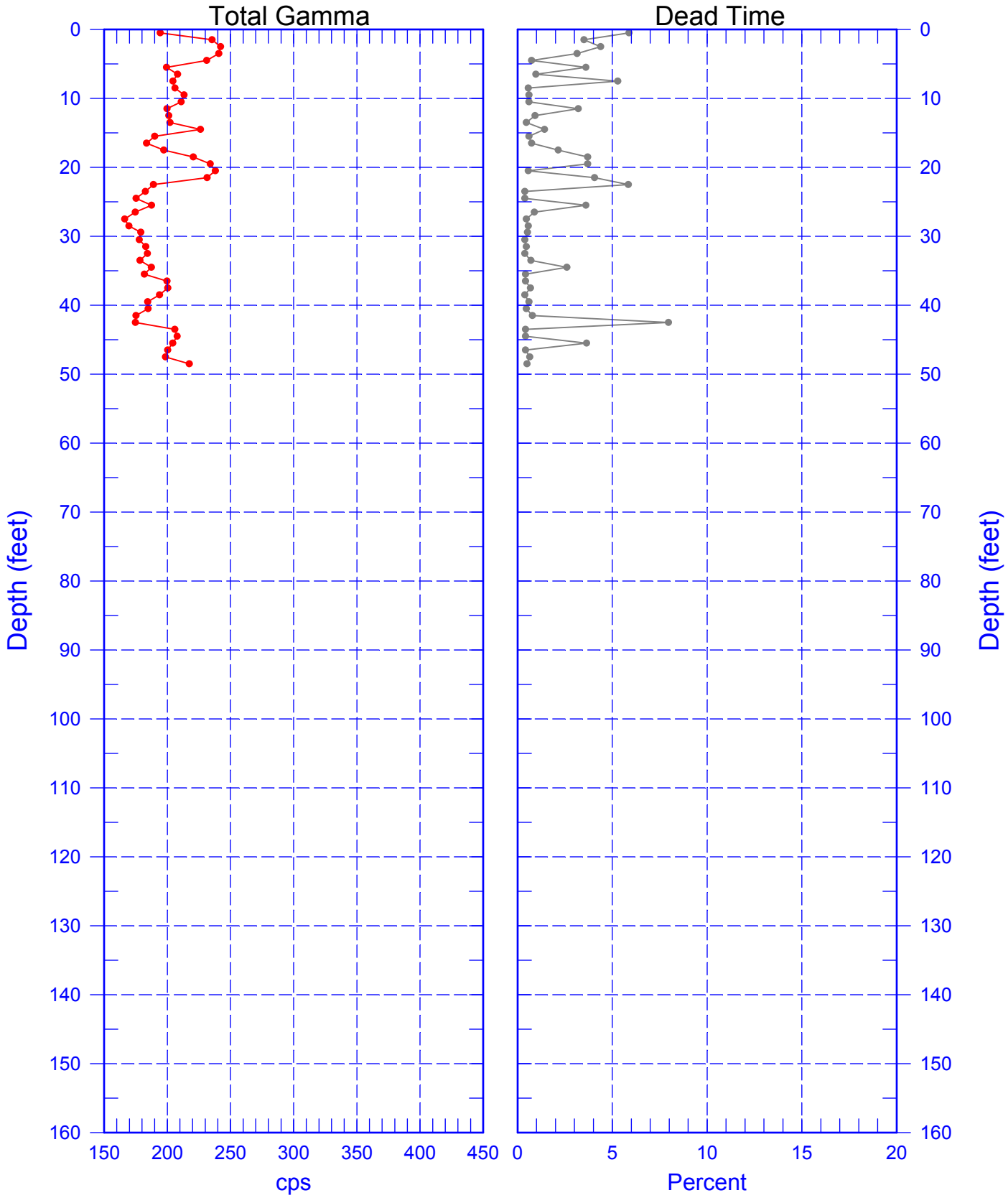
Total Gamma & Dead Time



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1/26/2004